

Thomas Bury

Curriculum Vitae

Department of Applied Mathematics
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Education

- 2015-2019 **PhD, Applied Mathematics**, *The University of Waterloo*.
Thesis title : On the nature and prediction of tipping points in complex systems.
GPA : 96.4%
Advisors : Prof Chris Bauch, Prof Madhur Anand
- 2011-2015 **BA, MMATH, Mathematics**, *Queens' College, The University of Cambridge*.
Awarded first class honours. Courses included theoretical and biological physics.

Research Positions

- 2015-current **Doctoral Candidate**, *The University of Waterloo*.
Funded 4-year research post at the Dept. of Applied Mathematics to conduct research on early warning signals for tipping points in complex systems.
- 2017-2018 **Senate Graduate and Research Council**, *The University of Waterloo*.
Math grad student representative for matters of academic quality and research activity within the university.
- 2014 Jun-Aug **DAMTP Research Placement**, *The University of Cambridge*.
Funded summer research post at the Dept. of Applied Mathematics and Theoretical Physics to analyse the spatio-temporal dynamics of the 2009 UK Influenza outbreak.

Invited Talks

- August 2018 ESA Annual Meeting 2018, '*Early warning indicators of ecological tipping points: do they predict critical transitions in multi-stable systems, or something else?*'.

Contributed Talks

- May 2018 WICI Workshop, Leveraging systems approaches to improve human & planetary health, '*A Hands-On Introduction to Mathematical Modelling*'.
- Jan 2018 Centre for Teaching Excellence, University of Waterloo, '*Breaking the Norm: Cooperative Learning in the Undergraduate Math Classroom*'.
- Jan 2018 Dynamics Days U.S., '*Characterising impending transitions in complex systems*'.
- Nov 2017 GRADTalks, University of Waterloo, '*Tipping Points and the Role of Mathematics*'.
- Sept 2017 TEDx, University of Toronto, '*Tipping Points and the Role of Mathematics*'.
- Aug 2017 AMMCS International Conference, '*Anticipating critical transitions in socio-ecological systems*'.

- Jul 2017 Mathematical Models in Ecology and Evolution Conference, City University of London, '*Regime shifts in socio-ecological systems : silent early warning signals in the natural subsystem*'.
- May 2017 WICI, Resilience in Complex Natural and Human Systems, University of Waterloo, '*Early warning signals in socio-ecological systems*'.
- Mar 2016 Applied Mathematics Graduate Colloquium, University of Waterloo, '*Modelling infectious disease: can we anticipate critical transitions?*'.

Journal Publications

- P1 T. M. Bury, C. T. Bauch, and M. Anand. Charting pathways to climate change mitigation in coupled socio-climate models. *Nature Communications (in review)*, 2018.
- P2 A. D. Pananos, T. M. Bury, C. Wang, J. Schonfeld, S. P. Mohanty, B. Nyhan, M. Salathé, and C. T. Bauch. Critical dynamics in population vaccinating behavior. *Proceedings of the National Academy of Sciences*, page 201704093, 2017.

Awards and Grants

- Jan 2018 Travel grant for ESA annual meeting. (\$1000) *WICI*
- Jan 2018 Travel grant for conference 'Dynamics Days U.S.' (\$1000) *WICI*
- Nov 2017 GradTalks research dissemination award (\$500). *University of Waterloo*
- Apr 2017 Public speaking award (\$300). *Fields Thesis Competition*
- Feb 2017 Faculty level winner. *Three-Minute-Thesis competition*
- Jul 2016 Foundation Scholarship. *Queens' College, University of Cambridge*

Teaching

Certifications

- 2016-current **Certificate of University Teaching**, *University of Waterloo*.
A two-year, in depth, selective teaching course for PhD students interested in pursuing an academic career. In progress.
- 2015-2016 **Fundamentals of University Teaching**, *University of Waterloo*.
University teaching course with emphasis on active learning. Consists of weekly workshops and three teaching assessments. Teaching reviews available.

Select teaching appointments

- Fall 2018 **Course Instructor**, *University of Waterloo*.
 - Course : Calculus I for the Sciences, 115 students, 1 teaching assistant
 - Contribution: Designed and implemented lectures three times a week, aided construction of exams and projects, managed teaching assistant and tutorial sessions.
- Fall 2016 **Lead Teaching Assistant**, *University of Waterloo*.
 - Course : Calculus I for Engineers, 667 students, 11 teaching assistants
 - Contribution: designed weekly problem sheets with solutions for the course, ran interactive tutorial sessions, held office hours, marked and proctored exams
- Winter 2018 **Teaching Assistant**, *University of Waterloo*.
 - Course : Stochastic processes in the physical sciences, 15-20 graduate students, 1 teaching assistant
 - Contribution: gave guest lectures on specialist topics, provided sample code with live demonstrations, extended course notes, marked assignments

Data Science

- Sept 2018 **Citadel Data Open**, Selected to compete in the datathon hosted by Citadel | Citadel Securities..
- June - Aug 2018 **Edulib Deep Learning**, Completed Edulib's online deep learning course: *'Introduction à l'apprentissage profond'*.
- Sept 2018-current **ColumbiaX Machine Learning**, Advanced level online machine learning course from Columbia University.

Volunteering

- 2016-current Let's Talk Science: A national, charitable organisation focused on outreach of STEM subjects to schools across Canada. Active volunteer.
- Mar 2017 Centennial Public School, Waterloo: Science fair judge
- Dec 2016 STC Physics Lab Day, University of Waterloo: Facilitator
- Jul 2014 Millennium Mathematics Project, University of Cambridge: Volunteer at mathematical epidemiology workshop for schools.

Memberships

Deep learning in the Information Lab - University of Waterloo
Society for Industrial and Applied Mathematics
Waterloo Institute for Complexity and Innovation
Institute of Mathematics and its Applications

Programming skills

Matlab, Mathematica, Python
C, R

*strong
competent*

Languages

English
French

*mothertongue
conversational*

References

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